# FloodSAFE focus

A publication of the Department of Water Resources FloodSAFE California initiative

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## Enhanced Observing Network will Help Identify Potential Flood-Producing Storms

California is improving its ability to forecast flood-producing rainfall events with a combination of new observation equipment and expanded monitoring sites at more than 100 locations throughout the state. A partnership between the California Department of Water Resources (DWR) and the National Oceanic and Atmospheric Administration (NOAA) is installing equipment to monitor atmospheric snow levels, wind structure, soil moisture, and water vapor content. The enhanced network should be in place by 2014.

The new equipment includes: snow level radar that provides information on the elevation in the atmosphere at which precipitation becomes snow; a wind profiler that measures the 3-dimensional structure of the winds through the atmosphere above the device; and soil moisture sensors that measure the wetness of the watersheds, which affects the timing and size of runoff from storms.

To measure water vapor in the atmosphere, the team is adding equipment to measure temperature, humidity, and other weather conditions at locations where global positioning system (GPS) sensors currently monitor tectonic activity in the state. Together, the weather monitoring data and GPS signal can be used to determine the amount of water vapor sitting in the atmosphere above the GPS sensors.

*Snow level radar, such as the above installation at Shasta Dam, monitors the rain/snow "transition zone," which is an important component in forecasting runoff from storms.*

Data from the new equipment combined with data from the weather monitoring equipment and GPS sensors will allow forecasters to determine if a flood-producing storm is possible.

This effort to improve California's weather monitoring system is an outcome of NOAA's recent Hydrometeorological Testbed Study in Northern California. A "testbed" is a group of public and private researchers and scientists working together to transfer research into real-life operations.. The study was focused on "atmospheric rivers"—narrow bands of moisture in the atmosphere which develop in the tropical region of the Pacific Ocean. Major floods in California result from a combination of robust winter storms and atmospheric rivers. The air's high moisture content combined with strong winds and California's topography can produce rainfall events that rival hurricanes experienced in the Gulf States and on the East Coast.

Data, reports, and other information related to NOAA's Hydrometeorological Testbed program is available at *http://hmt.noaa.gov/*.

**In This Issue:**



**Vision:**

*A sustainable integrated flood management and emergency response system throughout California that improves public safety, protects and enhances environmental and cultural resources, and supports economic growth by reducing the probability of destructive floods, promoting beneficial floodplain processes, and lowering the damages caused by flooding.*

FloodSAFE CALIFORNIA

## Areas for Improvement Identified Following Golden Guardian 2011 Exercise

Following the Golden Guardian 2011 Full Scale Exercise, event participants identified specific areas in which California's emergency response practices could be improved, such as by enhancing communications infrasturcture and formalizing standard operating procedures.

Sponsored by the California Emergency Management Agency, with flood operations led by the Department of Water Resources, the May 17-19 event simulated the atmospheric river conditions in 1996-97 that resulted in widespread Central Valley flooding. Such exercises are designed to test the capabilities and responsiveness to emergency situations and identify areas for improvement.

"This is the most extensive Golden Guardian exercise since the series started in 2004," DWR Golden Guardian Lead Planner Brian Smith said. "More than 250 DWR staff were deployed and field command posts were established at Hamilton City, Twitchell Island and Firebaugh. Feedback we received was that the event was very realistic and a great learning experience for all participants."

*The California Conservation Corps was among the more than 60 organizations and agencies throughout the Central Valley to participate in the May 2011 Golden Guardian exercise.*

Other participating agencies included the National Weather Service, the California National Guard, the California Conservation Corps, the U.S. Army Corps of Engineers and counties and local maintaining agencies in the Central Valley from Siskiyou in the north to Kern in the south.

Post-exercise analysis showed that the event met DWR objectives and identified additional key areas of improvement. Among these for DWR was improved infrastructure in the Flood Operations Center; improved communication between the FOC and deployed Incident Command Teams; and the formalization of standard operating procedures of operations, planning/intelligence, logistics, and finance/administration functions.

### Satellite-Supported Systems Tested During Emergency Communications Drill

Because maintaining communication is essential and mission-critical during floods and other emergencies, DWR held a drill in April 2011 to test incident command teams' ability to use emergency satellite communication and other backup systems.

During the 4-hour exercise, DWR mobilized its three emergency command communication trailers that responders would use to exchange on-the-ground information with the Flood Operations Center in Sacramento if an emergency event disrupted normal communication lines. The drill helped staff prepare for the Golden Guardian flood exercise.

### Public Briefings Held to Discuss Central Valley Flood Protection Plan

As part of the 2012 Central Valley Flood Protection Plan (CVFPP) development process, DWR hosted web briefings on May 4 and 5 to update CVFPP work group members and partners on the plan's status.

DWR also hosted public workshops on the CVFPP technical analyses on June 2 in West Sacramento and June 10 in Stockton. The workshops provided information about the status and initial content of the technical analyses supporting both the 2012 CVFPP and the development of the State Systemwide Investment Approach (SSIA). The SSIA incorporates elements from three alternative approaches to flood management: achieve state plan of flood control design capacity; protect high risk communities; and enhance flood system capacity.

To listen to the audio recording of the web briefings or for more information on the technical workshops, please visit *http://www.water.ca.gov/cvfmp/*.

An **atmospheric river** is a band of concentrated moisture in the atmosphere that can cause extremely strong or prolonged rain events. Atmospheric rivers were responsible for some of California's largest floods on record.

## TRLIA Continues Next Phase of Award-Winning Levee Improvement Program

In March, the American Society of Civil Engineers, Region 9, presented its Outstanding Flood Management award to the Three Rivers Levee Improvement Authority (TRLIA) for the Feather River Setback Levee project featured in the July 2010 issue of *FloodSAFE Focus*. In June 2011, TRLIA broke ground on a project to install a slurry wall and a seepage berm in the Upper Yuba River Levee. Scheduled for completion this year, the Upper Yuba Levee Improvement Project will close out a seven-year effort to improve a 29-mile levee system in south Yuba County. Portions of this levee system failed catastrophically in 1986 and 1997, causing multiple deaths and approximately $600 million in damages and ultimately leading to TRLIA's creation.

TRLIA recently began a related effort in the Goldfields, an area located on the Yuba River northeast of Marysville and just upstream of the Upper Yuba Levee Improvement project. The area, home to historic and current gold and aggregate mining activities, is filled with gravel pits that can act as a floodway. In 1950, the Goldfields contributed to flooding that devastated the area. TRLIA is performing hydraulic modeling of the Goldfields to identify its risk of flooding under the 200-year flood event scenario. Results from this modeling, anticipated in fall 2011, may lead to another TRLIA flood protection project.

To date, the State has invested approximately $265 million in TRLIA's levee improvement program through Proposition 13 and 1E funds. The balance of the $405 million for TRLIA's overall levee improvement program has been provided by Yuba County, the Yuba County Water Agency, Reclamation District 784, and local development interests. The Federal Emergency Management Agency has accredited the 29-mile levee system as providing a 100-year level of protection.

For more information, visit *www.trlia.org*

*Gravel pits in the Goldfields area along the Yuba River are the result of more than 100 years of mining activities that radically changed the water's flow path from the river.*

### 2011 Calendar

***July 22*** *– Central Valley Flood Protection Board Meeting, 8:30 a.m., Sacramento*

***August 5*** *– California Water Plan Update 2013 Tribal Advisory Committee Meeting, 9 a.m., Sacramento*

***August 24*** *– California Water Plan Update 2013 Public Advisory Committee Meeting, 9 a.m., Sacramento*

***August 26*** *– Central Valley Flood Protection Board Meeting, 8:30 a.m., Sacramento*

*http://water.ca.gov/calendar/*

A final sample flood safety plan is now available to help local levee maintenence agencies and local governments prepare plans that meet state requirements. The sample plan is at *http://tinyurl.com/floodsafetyplans*

## New Report Presents Alternatives for Managing Risk in the Delta

The final Delta Risk Management Strategy Phase 2 report is now available. During Phase 1 of the project, DWR assessed the performance of Delta and Suisun Marsh levees, identifying potential economic, environmental, and public health and safety consequences of levee failures – both for the Delta region and California as a whole. In Phase 2, distinct trial scenarios were developed to address the risks identified in Phase 1. Although the Phase 2 report is not a decision document and makes no recommendations for managing the Delta, these trial scenarios may provide insight into where risk reduction benefits exist for the various assets and resources in the Delta and Suisun Marsh. The report and information on the project can be found at *http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp*.

## High Water Staking Program Collects Data to Understand River Flows Between Gauges

DWR is formalizing a process for collecting water-level data during high water events. This data will help state and local entities understand the behavior of the rivers and levees that are part of the central valley's flood management system. Since the late 1880s, California agencies have placed stakes at the high water marks along river banks and recorded the height of the marks to measure the water level. Called "high water staking," this activity helps fill the data gaps between measuring gauges in the state's rivers. To support this effort, DWR is developing a data collection manual and other guidance materials that DWR staff had the opportunity to test on the ground during recent high water conditions. DWR will be engaging potential partners, such as local levee agencies, to participate in the staking process. Local agencies interested in participating in this project should contact Tasmin Eusuff at *teusuff@water.ca.gov*.

## Sycamore Creek Restoration Begins

This month, DWR is scheduled to begin the restoration phase of the Sycamore Creek Channel Rehabilitation Project. During the construction phase of the estimated $1.6 million project, DWR removed approximately 50,000 cubic yards of sediment from Sycamore Creek to improve its ability to safely carry the flood flows for which it was designed.

*Sycamore Creek restoration will replace vegetation cleared during removal of 50,000 cubic yards of sediment from 4,700 feet of channel.*

Sycamore Creek's habitat supports a diversity of native plants, fish, and other wildlife. Mitigation measures are being taken to alleviate any loss of wetlands that occurred as a result of sediment removal. During restoration, the channel bed will be replanted with native grasses, sedges and rushes, along with valley oaks and sycamore trees. Additionally, alternating 100-foot sections of riparian vegetation are being added along the low-flow channel to mitigate for riparian habitat removed during construction. The Sycamore Creek Channel Rehabilitation Project is currently scheduled to be completed in June 2012. For more information, contact Bonnie Ross at *bross@water.ca.gov*.

*A periodic newsletter highlighting the progess to produce the 2012 Central Valley Flood Protection Plan and the related FloodSAFE efforts within the California Department of Water Resources*

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